

Claims

1. A composition for protecting tissue or an organ of a mammal from damage when isolated from the circulatory system, comprising:
 - (a) a perfusion solution; and
 - (b) an amount of an amphipathic compound that inhibits metabolism effective to protect the tissue or organ from damage due to tissue anoxia, ischemia, or reperfusion injury.
2. The composition of claim 1, wherein the perfusion solution comprises a preservation solution.
3. The composition of claim 2, wherein the preservation solution is selected from the group consisting of Krebs-Henseleit solution, University of Wisconsin solution, St. Thomas II solution, Collins solution, and Stanford solution.
4. The composition of any of claims 1-3, wherein the amount of an amphipathic compound that inhibits metabolism is effective to prevent lactic acidosis.
5. The composition of any of claims 1-4, wherein the amphipathic compound that inhibits metabolism is selected from the group consisting of bupivacaine, levo-bupivacaine, etidocaine, ropivacaine, and tetracaine.
6. The composition of claim 5, wherein the amphipathic compound that inhibits metabolism is bupivacaine.
7. The composition of claim 6, wherein the composition comprises 50 μ M to 2 mM of bupivacaine.
8. The composition of any of claims 1-7, wherein the organ is selected from the group consisting of brain, heart, lung, kidney, liver, skeletal muscle, and bowel.
9. The composition of claim 8, wherein the organ is the heart.

10. A method of protecting tissue or an organ of a mammal from damage due to tissue anoxia, ischemia, or reperfusion injury, the method comprising contacting the tissue or organ with an effective amount of the composition of any of claims 1-9.
11. The method of claim 10, wherein the tissue or organ is contacted prior to removal from the mammal.
12. The method of claim 10, wherein the tissue or organ is contacted after removal from the mammal.
13. The method of any of claims 10-12, wherein the mammal is selected from the group consisting of human, pig, and baboon.
14. The method of claim 13, wherein the mammal is human.
15. The method of any of claims 10-14, further comprising the step of contacting the tissue or organ with an amount of a lipid emulsion effective to reverse the effect of the amphipathic compound that inhibits metabolism on the tissue or organ.
16. The method of claim 15, wherein the tissue or organ is contacted with the lipid emulsion prior to transplantation into a host.
17. The method of claim 15, wherein the tissue or organ is contacted with the lipid emulsion after transplantation into a host.
18. A method of protecting tissue or an organ of a mammal from damage due to tissue anoxia, ischemia, or reperfusion injury, the method comprising administering an effective amount of the composition of any of claims 1-9 to the mammal.
19. The method of claim 18, wherein the composition is administered systemically.
20. The method of claim 18, wherein the composition is administered directly to the tissue or organ.

21. The method of any of claims 18-20, wherein the tissue anoxia, ischemia, or reperfusion injury is due to isolation of the tissue or organ from the circulatory system.
22. The method of claim 21, wherein the tissue anoxia, ischemia, or reperfusion injury is due to interruption of the arterial blood supply occurs during a transplant or other surgery.
23. The method of claim 22, wherein the surgery is a cardiopulmonary bypass surgery.
24. The method of any of claims 18-23, wherein the mammal is human.
25. The method of any of claims 18-24, further comprising the step of administering an amount of a lipid emulsion effective to reverse the effect of the amphipathic compound on the tissue or organ.
26. A method of protecting tissue or an organ from damage due to tissue hypoxia, the method comprising:
 - (a) contacting the tissue or organ with an amount of an amphipathic metabolic inhibitor effective to prevent lactic acidosis; and
 - (b) administering an amount of a lipid emulsion effective to reverse the effect of the amphipathic metabolic inhibitor on the organ.
27. A kit comprising the composition of claim 1 in one or more containers.
28. The kit of claim 27, further comprising a lipid emulsion in one or more containers.
29. The kit of claim 27 or 28, further comprising a device to administer the composition or the lipid emulsion to a mammal.
30. The kit of claim 29, wherein the device is selected from the group consisting of a catheter, a syringe, or a cannula.

31. The kit of any of claims 27-29, further comprising a programmable device for administering the one or more compositions of the kit.